JACC Vol. 15, No. 2
February 1990:220A

MYOCARDIAL THALLIUM-201 UPTAKE AND LONG-TERM FUNCTIONAL RECOVERY AFTER MYOCARDIAL INFARCTION WITH REPERFUSION THERAPY

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To evaluate the relation between myocardial thallium-201(Tl) uptake in infarcted regions and long-term functional recovery after reperfusion therapy, we studied Tl scintigraphy(3days, 33months) and Tc-99m ventriculography (3days, 52days, 33months) in 90 patients(pts) with first anterior infarction(SR;spontaneous recanalization 17, ICT ;intracoronary thrombolysis or PTCA(ICTA) 62, OC;occlusion without intervention 11). The Tl uptake in infarcted myocardium was analyzed and LVEF was calculated. The pts were divided into 55 pts with improvement of Tl uptake from 3 days to 33 months(GI) and 55 pts without improvement(GII). GI consisted of 19 pts with more than 45% in LVEF on 3 days(GIa) and 16 pts with less than 45% in LVEF(GIb). The prevalence of GI was high in pts with SR and reperfusion therapy, but none in pts with OC(SR 82 %, ICTA 34% vs OC 0%; p<.01 in both). The long-term LVEF and the Tl uptake on 3 days were as follows.

	GIa	GIb	GII	
LVEF 3days	54±5%	36±8%	36±10%	
52days	61±6%*	50±12%*	36±3%	*vs3days p<.05
33months	59±6%	55±9%**	30±10%	**vs52days p<.05
Tl uptake(3days)	72±12%*	66±13%*	51±12%	*vsGII p<.01

Thus, the pts with reperfusion often had improved Tl uptake, which was associated with long-term functional recovery. This improvement may be predicted by the Tl uptake on 3 days even in pts with low LVEF. In conclusion, the Tl uptake on early period may be a marker of viability and long-term functional recovery.

WHAT IS THE SIGNIFICANCE OF TRANSIENT ISCHEMIC DILATATION OF THE LEFT VENTRICLE DURING DIPYRIDAMOLE THALLIUM-201 TESTING?

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The occurence and significance of transient ischemic dilatation (TID) of the LV during dipyridamole (dipy) stress-redistribution Tl-201 scintigraphy was studied in 73 pts who had both dipy Tl-201 and coronary angiography. TID ratio was calculated by dividing the computer derived left ventricular area on the initial planar anterior image by that of the 4 hr image. The extent of myocardial ischemia was evaluated by Tl-201 reversibility score (initial - redistribution visual scores) and a score of ≥ 7 was considered to represent extensive ischemia. In the 11 pts with non-significant (<50%) coronary stenosis the TID ratio was 0.98 ± 0.046. An abnormal TID ratio was thus defined as ≥ 1.12 representing $\geq$ 3SD above the mean normal value. Comparing the 15 pts with an abnormal TID ratio to the 58 with a normal ratio, the former group had a significantly higher ($p<.05$) incidence of critical ($\geq$90%) coronary stenosis (93% vs 55%) often with collaterals (67% vs 24%), extensive myocardial ischemia (54% vs 12.5%) and a lover incidence of prior myocardial infarction (33% vs 72%). The incidence of dipy induced positive ECG, increased lung uptake and chest pain was not significantly different. An abnormal TID ratio of $\geq$1.12 was a sensitive (5/8 = 62.5%) and specific (55/65 =85%) marker of triple vessel critical coronary disease. We conclude that transient ischemic dilatation of the LV may be observed during dipyridamole Tl-201 scintigraphy and implies extensive myocardial ischemia caused by underlying critical coronary stenosis.

DIPYRIDAMOLE METABOLIC SCINTIGRAPHY USING I-123 PHENYLPENTADECANOIC ACID VS DIPYRIDAMOLE THALLIUM-201 PERFUSION IMAGING FOR THE DETECTION OF CORONARY ARTERY DISEASE.

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Noninvasive detection of CAD is possible with either dipyridamole I-123 phenylpentadecanoic acid (IPPA) metabolic imaging or thallium-201 (Tl) perfusion imaging. We compared dipyridamole IPPA vs Tl in 50 pts with chest pain (33 pts with and 17 without CAD defined as $\geq$70% diameter stenosis by quantitative angiography). Pts were imaged tomographically (2 serial 16 min studies) after dipyridamole and IPPA and similarly had tomographic acquisitions after dipyridamole and Tl (two 25 min studies, 4 hrs apart). The more rapid clearance of IPPA vs Tl allows for much earlier IPPA redistribution imaging. Results for sensitivity (SENS), specificity (SPEC) and diagnostic accuracy (DIAG ACC) using qualitative image analysis follow:

	SENS(%)		SPEC(%)		DIAG ACC (%)	
	IPPA	Tl	IPPA	Tl	IPPA	Tl
CAD	94	88	77	65	88	80
LAD	73	55	75	82	74	70
LCX	61	61	94	91	82	80
RCA	88	94	68	56	74	68

Dipyridamole IPPA and Tl imaging have similar diagnostic accuracy for the detection of CAD. However, immediate redistribution IPPA imaging provides greater patient and laboratory convenience. Thus, dipyridamole IPPA imaging is an attractive alternative to dipyridamole Tl scintigraphy.

COMPARATIVE SENSITIVITY AND SPECIFICITY OF Rb-82 PET AND Tl-201 SPECT IMAGING IN THE DIAGNOSIS OF CORONARY ARTERY DISEASE.

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In order to determine the comparative sensitivity and specificity of Rb-82 and Tl-201 myocardial imaging in the diagnosis of coronary artery disease (CAD), 170 patients were subjected to a single dipyridamole stress with hand-grip. Rest and stress Rb-82 (40-60 mCi; Squibb Diagnostics) and Tl-201 (2-3 mCi) studies were obtained using the Posicam PET (Positron Corporation) and Triad SPECT (Trionix Inc.) systems respectively. Tl-201 was injected after the beginning of Rb-82 stress acquisition. A stenosis of a major coronary artery of $\geq$ 50% defined critical CAD.

Analysis of the total population showed a sensitivity and specificity of 73% and 77% for Tl and 88% and 84% for Rb. Excluding 51 patients with previous bypass surgery or PTCA increased the sensitivity to 76% (Tl) and 90% (Rb).

Results show an increased sensitivity in Rb-82 over Tl-201 by analysis of either total population or population excluding patients with previous therapeutic intervention. Specificity also shows an increase with PET imaging.